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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,442	07/25/2003	Chien-Min Sung	22001	3424

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EXAMINER	
MARCHESCHI, MICHAEL A	
ART UNIT	PAPER NUMBER
1755	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/627,442	SUNG, CHIEN-MIN	
	Examiner	Art Unit	
	Michael A. Marcheschi	1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/3/06*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17 and 21-30* is/are pending in the application.

4a) Of the above claim(s) *21-30* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite as to the limitation "said mass being greater than 98% by volume of nanodiamond or non-diamond carbon with greater than about 95% by volume in the form of nanodiamond" because the first part of this limitation defines that the mass can be greater than 98% by volume of nanodiamond (if chosen from the Markush grouping of nanodiamond or non diamond carbon) and the second part of this limitation defines that of this, greater than about 95% by volume is in the form of nanodiamond. This is confusing because the examiner is unclear as to what is the volume percent of the nanodiamond? Is it 98% or 95%? This claim is not drafted in a clear and concise manner as to enable complete understanding of the claimed invention.

Claim 5 is indefinite since carbon does not necessary imply diamond (carbon can exist in many forms (i.e. graphite, etc.). In view of this, how can the mass consists only of carbon (i.e. other forms of carbon broadly encompassed by the limitation carbon)? The way the claim is drafted is confusing because the limitation "consists of carbon" reads on a mass that consists of graphite, which is clearly not intended because in claim 1, the mass can only be nanodiamond. This is apparent because the fist part of the above limitation (see limitation defined in the rejection of claim 1) defines that the mass can be greater than 98% by volume of nanodiamond

(if chosen from the Markush grouping of nanodiamond or non-diamond carbon) and the second part of this limitation defines that of this, greater than about 95% by volume is in the form of nanodiamond, thus the entire structure can be nanodiamond and contain no other forms of carbon. Is the carbon defined in claim 5 the nanodiamond or can other forms of carbon be present? If other forms are present, how can they constitute all of the mass. This claim is not drafted in a clear and concise manner as to enable complete understanding of the claimed invention.

The other claims are indefinite because they depend on indefinite claims.

PREVIOUS ART REJECTIONS:

(1) Claims 1-7, 10 and 16-17 are rejected under 35 U.S.C. 103(a) as obvious over Akashi et al. for the same reasons set forth in the previous office action which are incorporated herein by reference.

(2) Claims 1-6, 10 and 16-17 are rejected under 35 U.S.C. 103(a) as obvious over JP 2-30667 for the same reasons set forth in the previous office action which are incorporated herein by reference.

(3) Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as obvious over Akashi et al., applied to claim 1 above and in view of Cerutti for the same reasons set forth in the previous office action which are incorporated herein by reference.

(4) Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as obvious over JP 2-30667, applied to claim 1 above and in view of Cerutti for the same reasons set forth in the previous office action which are incorporated herein by reference.

(5) Claims 12-14 are rejected under 35 U.S.C. 103(a) as obvious over ***either*** (1) Akashi et al. in view of Cerutti as applied to claim 11 above or (2) JP 2-30667 in view of Cerutti as applied to claim 11 above ***all*** in view of Phaal et al. and Wentorf, Jr. et al. for the same reasons set forth in the previous office action which are incorporated herein by reference.

Applicant's arguments filed 11/3/06 have been fully considered but they are not persuasive.

The previous rejections based on Phaal et al., Wentorf, Jr. et al., Sumiya (217), Yoshida et al., Nakai et al., Cerutti and Hall et al., as the primary references only, have been withdrawn in view of the amendments to the claims

The only rejections that remain from the previous office action are outlined above.

With respect to JP 2-30667, applicants appear to argue that the mass of this reference is not a nanodiamond mass, as consistent with the instant claims. The examiner disagrees because the entire mass of the reference is made of nanodiamond particles because applicants define nanodiamond as including micro sized particles-see claim 6 and page 2, lines 22-23 of the specification.

With respect to Akashi et al., applicant argues that the declaration of Dr. Cho (submitted with previous response) supports the position that Akashi et al. does not teach nanodiamond (declaration states that this reference is micron diamond). The declaration does provide evidence that this reference is only directed to micron diamond and is also an opinion declaration. Applicant also argues that "0 grade to 1000 grade', as defined by the reference, is a conventional terminology for micron sized diamond and is typically 1-2 microns. No evidence is provided to

support this. Even taking into consideration the 1-2 microns as argued by applicants, this size still reads on instant claims 1-6, 10 and 16-17 because applicants define nanodiamond as including micro sized particles-see claim 6 and page 2, lines 22-23 of the specification. Not withstanding applicants arguments, the reference clearly teaches in claim 3 that the size of the diamond can be 50 nm and this reads on all of claims 1-7, 10 and 16-17. With respect to the absence of a sintering aid, the declaration submitted with the previous response states that there is no teaching of this. The examiner disagrees because the reference states that additives are optional (column 8, lines 18).

With respect to the combination rejections above, applicants do not argue the examiners reasons for combining. At most, applicants arguments are based on all the secondary references containing a catalyst. The examiner acknowledges this, however, the secondary references have not be used for the teaching of the claimed diamond mass but rather to show that the limitations of the claimed substrate, to which a diamond mass (diamond mass of the primary references) is to be attached, is known in the art. Applicant arguments do not clearly rebut the examiners reasons for the combination, as clearly outlined in the previous office actions, and present no evidence that said combination is improper.

On page 8 of the response, applicant states the requirements needed to sustain a rejection. The examiner is aware of these requirement. Applicant also argues that the PTO has failed to make a prima facie case of obviousness because (1) no motivation exists to combine the references, (2) the reference fails to provide a reasonable expectation of success and (3) the references fail to teach or suggest all of the claimed limitations. In response to (1) above, the majority of the rejections are only based on a single reference and not in combination with any

other reference, thus this aspect does not apply. However, in any combination rejections applied, the examiner has established reasons why any modification is obvious (motivated by the teachings of the primary that the compacts are used as a cutting tool and the apparent stress gradients of these references and the secondary reference teaching that cutting tools include a substrate and ways to minimize stress gradients). In response to (2) above, again the majority of the rejections are only based on a single reference and not in combination with any other reference, thus the references themselves provide an reasonable expectation of success because they are sole patents. However, in any combination rejections applied, the examiner has established reasons why any modification is obvious (see above) and thus with this modification, which is motivated by the references, it is the examiners position that a reasonable expectation of success is apparent because the secondary references are merely used to show (1) that cutting tools include a substrate which the primary references state that the compact can be used as and (2) ways to minimize stress gradients, which is important in layered compacts so as to minimize failure of said compacts. In response to (3) above, as outlined in the previous office action, all of the claimed features are taught or suggested by the references.

NEW ART REJECTIONS:

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 and 16-17 are rejected under 35 U.S.C. 102(b) as anticipated by WO 02/09909.

The WO reference teaches in the abstract, page 3, line 1, page 7, lines 19-20, page 8, lines 17+, and the claims, a diamond compact for abrasive operations (tool), said diamond compact comprising a self-sintered mass of diamond particles having a nanometer size (100 nm is specifically disclosed).

The claimed invention is anticipated by the reference because the reference teaches a diamond article comprising a self-sintered mass of nanodiamond particles (i.e. no catalyst is used). In view of this, the limitations of claims 1-2, 5-7 and 17 are meet. With respect to claims 3 and 4, the reference teaches a mass of nanodiamond diamond particles and these claims are defining process limitations, and as is well known, process limitations to define the product in "product-by-process" claims do not patentably distinguish the product even though made by a different process. *In re Thorpe* 227 USPQ 964. With respect to the limitation of claim 16, it is the examiners position that the reference tool meets this criteria because this is a function of the tool composition and since the composition is the same, it inherently has the same characteristic absent evidence to the contrary.

Claims 8-10 are rejected under 35 U.S.C. 103(a) as obvious over WO 02/09909.

With respect to the size of claims 8-9, the reference teaches that the size is less than 60 microns and this encompasses and therefore makes obvious the claimed nanometer size because the reference overlaps the claimed range. The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have

selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness, see ***In re Malagari*, 182 U.S.P.Q. 549; *In re Wertheim* 191 USPQ 90 (CCPA 1976).** With respect to the limitation of claim 10, it is the examiners position that absent evidence to the contrary, no recitation of particle orientation, makes obvious random oriented particles absence evidence to the contrary **and** evidence that the reference mass does not have this feature.

Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as obvious over WO 02/09909, applied to claim 1 above, in view of Cerutti

The WO reference states that the diamond compact can be used for abrasive operations and this broadly includes cutting tools and as is well known from the secondary reference, cutting tool based on diamond compacts are known to include a substrate attached to said compact. In view of this, it is the examiners position that the claimed limitations are obvious because the use of a substrate to make a diamond tool is well within the level of ordinary skill in the art.

Claims 12-14 are rejected under 35 U.S.C. 103(a) as obvious over WO 02/09909 in view of Cerutti, as applied to claim 11 above, in view of Phaal et al. and Wentorf, Jr. et al.

Phaal et al. teaches in claim 1 that diamond masses are known to be attached to a carbide support by way of a diamond/catalyst layer (coarser sized diamonds than in the mass).

Wentorf, Jr et al. et al. teach in column 4, lines 44-46 that diamond masses are known to be attached to a carbide support by way of a diamond/catalyst layer (can coarser sized diamonds than in the mass) in order to minimize the stress concentration.

It is the examiners position that in the articles according to WO 02/09909 in view of Cerutti stress gradients are apparent between the mass and the substrate and therefore it is the examiners position that one skilled in the art would have found the use of any teaching obvious to minimize the above stress gradients. Since the secondary references teach how this stress can be minimized, the use of any teaching to minimize the stresses is well within the level of ordinary skill in the art.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael A. Marcheschi whose telephone number is (571) 272-1374. The examiner can normally be reached on M-F (8:00-5:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-12331233. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

1/07
MM

Michael A. Marcheschi
Primary Examiner
Art Unit 1755